1.0 Washington's Electricity Landscape

Washington's economy and quality of life share with the rest of the nation a great dependence on the availability of high quality, reliable and affordable electricity service. However, Washington's electricity industry differs from the rest of the nation's in some important respects. While electricity service in most of the nation is dominated by relatively large investor-owned utilities with state-certified monopoly service territories, Washington's utilities are a diverse mix of both size and ownership, none of which have a state-certified monopoly service territory. The majority of electricity service is provided by utilities that are publicly-owned and locally controlled.

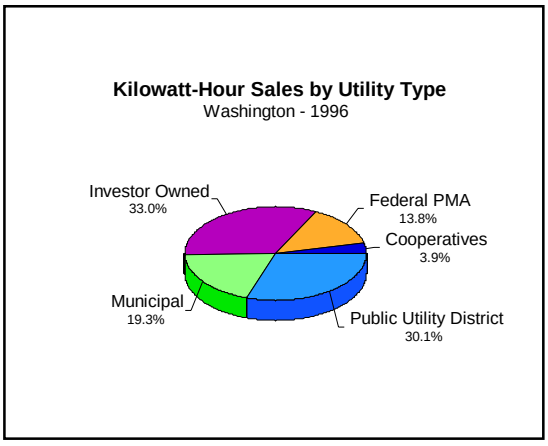
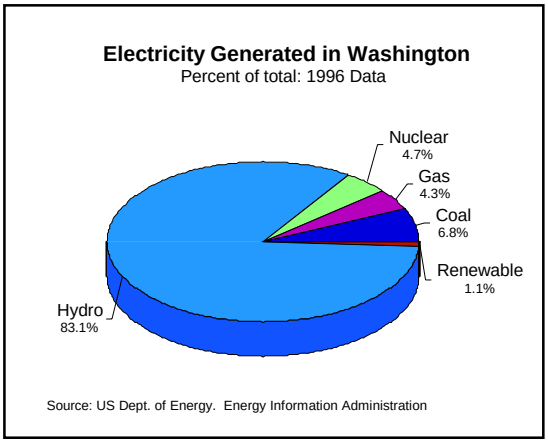


Figure 1.2

Kilowatt-Hour Sales by Utility Type
USA - 1996

Source: US Dept. of Energy. Energy Information Adminstration.

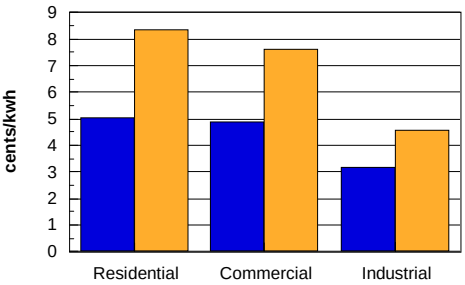
While most of the nation is served by electricity generated from fossil-fuel or nuclear sources, Washington's electricity industry is dominated by hydropower, which accounts for roughly a third of the nation's total hydropower generation. While this is a benefit of our geography, it comes with a cost. Hydropower development on the Columbia, Snake and other rivers is marked by one of the nation's most controversial environmental problems: survival and restoration of salmon populations. Our reliance on hydropower also complicates energy planning and policy because water, the fuel for power generation, is not only unpredictable in supply, but it is also a multiple-use resource important for irrigation, transportation, recreation, and other uses.



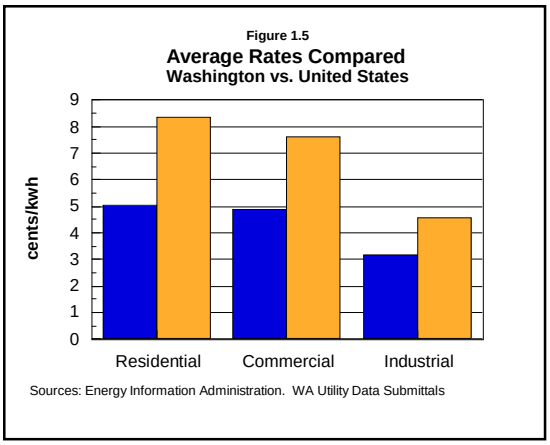
Source: US Dept. of Energy. Energy Information Administration

Figure 1.5

Average Rates Compared
Washington vs. United States



Sources: Energy Information Administration. WA Utility Data Submittals



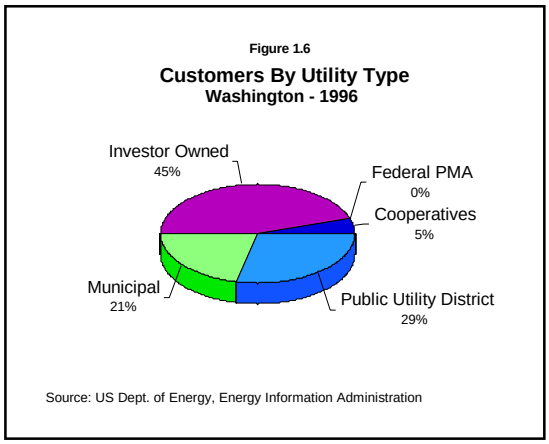
Few other states in the nation are as dependent as ours on federal facilities that generate and transmit electricity. More than half of the power generation and 80 percent of the high-voltage transmission serving Washington comes from the Bonneville Power Administration (BPA).

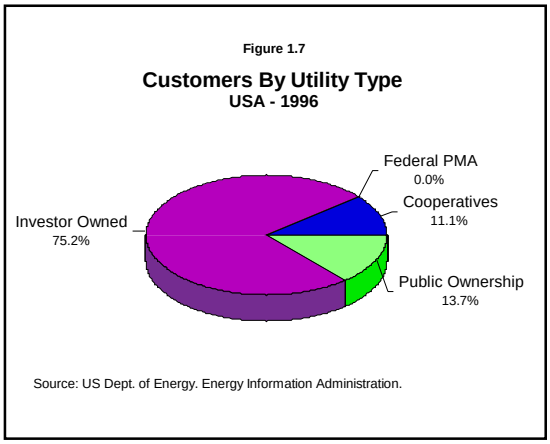
Finally, and most importantly, is our low power rates. Our reliance on hydropower, federal power resources, and a diverse mix of public and private utilities produces among the lowest electricity rates in the nation.

1.1 Washington's Utility Demographics

Utility Organization and Ownership

In 1996, Washington had more than 2.5 million electricity customers served by more than 60 utilities. These utilities vary greatly in size, ranging from Northern Lights Cooperative (an Idaho-based cooperative) which serves 14 customers in Pend Oreille County, to Puget Sound Energy which serves 864,462 customers in the Puget Sound area. The dozen largest utilities, together with the BPA's direct service to 10 large industries account for about **85** percent of the state's customers and electricity use.





Except for the Bonneville Power Administration, the various retail utilities in Washington are authorized and governed by a number of sections of state law. General service requirements and standards for electric utilities are set out in chapter 80.28 RCW. These statutes govern the three investor-owned utilities. These are the only utilities whose rates, terms and conditions of service are regulated by the state under the jurisdiction of the Washington Utilities and Transportation Commission

(WUTC). Municipal utilities, public utility districts, cooperative and mutual corporation utilities, irrigation districts and port districts are governed by combinations of the provisions of Title 80 RCW and specific enabling legislation. The municipal utilities are locally regulated as functions of city government authorized by Title 35 RCW. Public Utility Districts are locally regulated by elected county officials as authorized by Title 54 RCW. Cooperative and mutual corporations are locally regulated by membership boards and governed by chapters 23.86, 24.06, or 87.03 RCW.

Fifty-five percent of Washington's electricity customers and sales are served by locally-controlled and regulated utilities. While this is not the highest percentage of public power in the country — Nebraska is 100% public power and state regulated — it is one of the highest in percentages of local control.

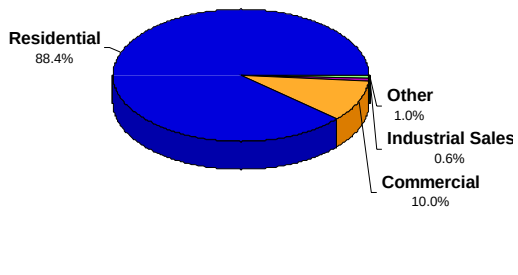
Washington also has the largest number of utility control areas of any state in the western U.S. A utility "control area" is the technical term for a geographical area of the electricity grid that is managed closely to ensure that all loads and generation are kept in balance at all times. These areas are components of the management framework by which the Western System Coordinating Council monitors and maintains electricity reliability throughout 14 Western states. To understand Washington's utility landscape, the technical details of control area operation are not as important as is the fact that the state contains 9 such areas. These areas may contain a number of individual utilities, or they may contain only one. Current technology and practice requires that scheduling of transmission between these control areas be for transfers of no less than 1 MW. Under current technology and practice, individual customers or aggregations of customers seeking competitive electricity supply would need to represent at least 1 MW of load in any control area. Control areas are operated in Washington by Seattle City Light, Tacoma Power, Puget Sound Energy, PacifiCorp, Grant County PUD, Chelan County PUD, Douglas County PUD, Washington Water Power, and the BPA.

Customer Characteristics

Washington's utilities serve approximately 2.5 million customer accounts. Of these, residential homes and apartments are the dominant proportion, representing 88 percent of the total. Commercial customers including medium-sized businesses, schools, hospitals, offices and retail stores make up 10 percent of accounts, and large industrial customers, street lighting and irrigation make up the remaining 2 percent. Proportional electricity sales are also dominated by residential accounts. However, the proportion of sales to commercial and industrial customers exceeds their proportion of the customer base, reflecting the higher electricity usage levels of these customers. These proportions are especially influenced by the 10 large industrial accounts served directly by BPA or over BPA transmission.

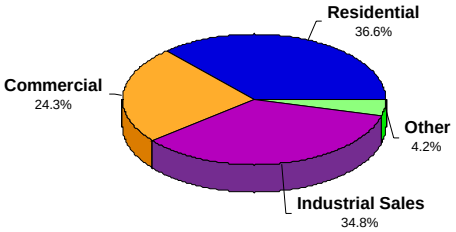
The wide variation in per-customer electricity consumption among the customer classes is further described in Table 1.1. Based on data reported by the utilities, the table depicts the number of customers whose annual electricity usage (kWh) or electricity demand (kW) falls within the specified range. The majority, or 65 percent, of electricity customers use fewer than 10,000 kWh annually. Some proposals

Figure 1.8



Source: US Dept. of Energy. Energy Information Administration.

Figure 1.9



Source: US Dept. of Energy. Energy Information Administration.

recently discussed for introducing competition in retail electricity service establish a threshold of 1 aMW*. Table 1.1 indicates that about 300 customers use more than 1 aMW of electricity annually. Among customers metered and billed on the basis of peak demand, the utilities report that 765 register an annual peak demand of 1 MW or more. The figures in this table represent a sample of more than 90 percent of Washington's electricity customers. So, while the figures in Table 1.1 capture the pattern of customer electricity use, they do not represent complete state totals.

Table 1.1. Distribution of Customers by Annual kWh and Annual Peak kW.

KWh (000)	# of Customers	Cumulative %	Peak KW	#of Customers	Cumulative %
0 to 9	1,460,749	64.98	0 to 99	12,981	52.2
10 to 49	739,478	97.88	100 to 149	3,958	68.2
50 to 99	18,699	98.71	150 to 199	2,079	76.5
100 to 200	11,621	99.23	200 to 249	1,234	81.5
200 to 499	10,129	99.68	250 to 299	852	84.9
500 to 999	3,617	99.84	300 to 349	645	87.5
1000 to .5 aMW	2,749	99.96	350 to 399	496	88.5
.5 to 1 aMW	477	99.99	400 to 449	414	91.2
1 to 2 aMW	166	99.99	450 to 499	310	92.4
2 to 4 aMW	78	100.00	500 to 999	1,118	96.9
> 4 aMW	70	100.00	> 1 MW	765	100.0
Total in Sample	2,247,833			24,852	

Source: 6560 Utility Data Survey (13 utilities reporting covering 94% of state customers)
Note: Customers reported by peak kW demand are only those metered and billed for demand.
Note: Does not include BPA direct service industrial customers.

Metering

For billing purposes, utilities install many types of meters to keep track of customer usage. Most meters measure only total accumulated electricity use and peak electricity demand for commercial and industrial accounts. They do not typically record when electricity is used. The capability of installed metering to provide time-of-use information is a key consideration when utilities offer new kinds of service such as time-of-use pricing or competitive access to alternative electricity providers. Data reported by the utilities indicates that currently fewer than 2, 000 of more than 2.2 million meters installed in Washington are capable of recording time-of-use to at least an hourly level of precision. Table 1.2 indicates that the majority of these meters are in the commercial and industrial sectors.

Table 1.2. Distribution of Standard and Time-of-Use Meters by Customer Class.

(number of meters. [fraction of meters in class])

	Residential	Commercial	Industrial	Total
Standard (Cumulative kWh/kW)	1,967,735	213,852	9,191	2,190,778
Time of Use (site or remote read)	642 [<.04%]	875 [.4%]	412 [4.3%]	1,929 [.09%]
Total Meters	1,968,377	214,727	9,603	2,192,707

Source: 6560 Utility Data Survey

While the preceding figures and tables capture the statewide character of utility demographics, they do not capture the diverse character of Washington's electric service providers. Table 1.3 demonstrates that the smaller utilities, mainly cooperatives, serve predominantly residential customers and customers categorized as "other" (often times irrigation loads). The investor-owned and PUD utilities also show a dominance of residential loads, but have substantial industrial load as well. The municipal utilities demonstrate the most even pattern across the classes. Finally, BPA's retail service in Washington is almost exclusively industrial, the remainder going to federal agencies.

Table 1.3. Proportion of kWh Sales by Customer Class for Each Type of Utility.

Utility Type	Residential	Commercial	Industrial	Other	Total
BPA	0.0%	0.0%	93.1%	6.9%	100%
Cooperatives	57.3%	21.4%	3.6%	17.7%	100%
Investor-Owned	45.7%	34.5%	19.4%	0.4%	100%
Municipal	35.4%	25.4%	29.4%	9.8%	100%
P.U.D.	41.5%	24.0%	32.5%	2.0%	100%
Total WA sales	36.6%	24.3%	34.8%	4.2%	100%

Source: Energy Information Administration. 1996.

1.2 Washington Electricity Rates

Electricity rates in Washington are set for investor-owned utilities by the WUTC and for public utilities by city councils, boards, or other local governing bodies. In both cases, rates are fundamentally based on the average cost of providing electricity service. A more detailed discussion of the way in which rates are developed is included in Section 4.0 [Electricity Rates and Equity]. Before comparing rates among utilities and between the state and the nation, two clarifications are necessary.

First, the *structure* of utility rates — the way in which individual utility bills are calculated — varies significantly among utilities. This variation includes how much revenue is collected from base, capacity demand, and energy charges. Decisions about how to structure rates in a fair and equitable way are made by state or local regulators based on the nature of the customer-base being served. We have focused our analysis on the average rate. This is the revenue collected from customers divided by the customer's electricity usage. The average rate is not affected by variations among utilities in the way customer bills are structured to include base charges, seasonal energy rates, capacity charges and energy block charges.

Second, utility costs vary depending on the nature of the territory the utility serves. For example, many small rural utilities must maintain distribution systems to serve very disperse customer loads. This may lead to higher service costs per customer than would be the case for an urban utility. While we have not attempted a detailed study of these differing cost circumstances, it is important to keep them in mind when comparing average rates among utilities.

Two sources of information are used for examining utility average rates. The first is information reported by utilities in response to the 6560 information survey. These data include utility revenue, customer counts and electricity use for each customer class for 1993 to 1997. The utility-reported data was provided by those utilities not

exempted from the 6560 legislation and therefore only covers 12 utilities plus six others that volunteered information. These utilities make-up approximately 85 percent of total state utility sales. The remaining utilities include relatively small cooperatives, mutuals, public utility districts, municipal utilities, irrigation districts, and BPA service to a limited number of direct service industries. For these utilities, we have relied on data collected and reported by the United States Department of Energy's Energy Information Administration (EIA). EIA data are reported annually for all utilities based on information reported by the utilities to EIA and other federal agencies. For both the 6560 data and EIA data, utilities categorize information into the basic customer classes: residential, commercial, industrial and other (including street lighting, irrigation and unclassified uses). Based on these two sources, appendix A includes average rates for each utility and for each customer class for the years 1993 through 1997. In the following sections, we examine statewide average rates by customer class and utility category, how these rates compare with national averages, and trends in both state and national rates. Table 1.4 presents statewide average rates for each of the customer classes for each of the years 1993 through 1997.

Table 1.4. Average Rate to Washington Customers 1993-1997, Cents per Kilowatt-Hour

Sector	1993	1994	1995	1996	1997
Residential	4.63	4.95	5.01	5.08	5.01
Commercial	4.50	4.70	4.81	4.92	4.82
Industrial	2.97	3.16	3.25	3.19	3.07
Other	4.03	3.96	4.27	4.21	4.49
All Sectors	4.14	4.38	4.47	4.53	4.44

Sources: Utility Data Reported to 6560 Study.

Taking 1996 as a year for comparison, Table 1.5 compares Washington average rates with national averages for each customer class. For all customer classes, Washington is not only substantially below the national average, but when all states are ranked, Washington is the lowest or near the lowest in all categories.

Table 1.5. Washington Electric Rates Compared to National Average - 1996

(ranked by statewide rates 1=lowest, 50 states + District of Columbia)

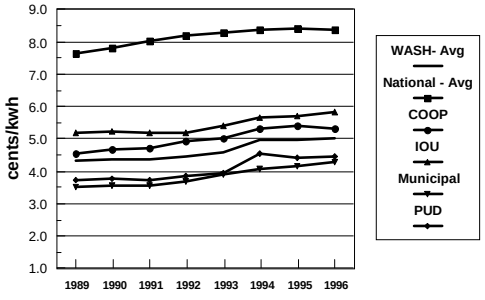
Category	Washington Rank	WA average rate (cents/kwh)	US average rate (cents/kwh)
Residential	1	5.03	8.36
Commercial	2	4.88	7.64
Industrial	2	2.85	4.60
Other	1	3.84	6.91
All Sectors	3	4.19	6.86

Source: Electric Sales and Revenue 1996, DOE/EIA-0540

Residential Rates

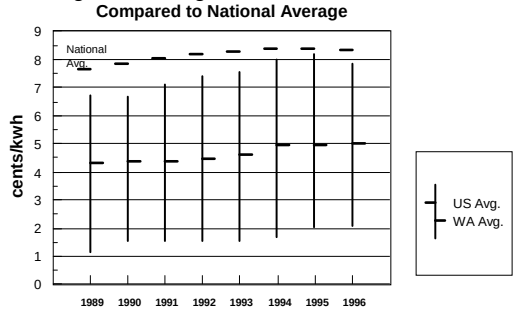
All utilities reporting information in our study offer a basic residential rate to homes and apartments for standard domestic uses. A few utilities offer more than one residential rate depending on such factors as electric space and water heating, but in general a single tariff covers utility service to the residential class. Figure 1.10 compares statewide residential average rates with the national average for the years 1989 through 1996. During this period, the national average rate increased by 0.71 cents/kWh or about 9.3 percent. For comparison, during the same period the Consumer Price Index measurement of inflation increased by nearly 35 percent. The Washington residential average rate also increased over this period by 0.70 cents/kWh. On a percentage basis this increase is 16.3 percent. The percentage increase is higher for Washington because it came on average rates that started at a lower level.

Figure 1.10
Residential Rates



Sources: Energy Information Administration. 6560 Survey of WA Utilities.

Figure 1.11
Range In Washington Residential Rates Compared to National Average



Source: Energy Information Administration and 6560 Survey Utility Data.

Figure 1.10 also plots statewide averages for each major category of utility. Differences in these rates reflect not only differences in utility costs related to type of ownership, but also the nature of the areas being served. Typically, cooperatives and relatively small public utilities serve rural areas and the municipals serve urban areas. The investor-owned utilities serve a mix of urban and rural areas as do many of the public utility districts. While there is variation in average rates among the utility types, all show modest upward trends in average rates and all are substantially below the national average.

Figure 1.11 takes a more detailed look at variation among the state's 60 some utilities by plotting the full range of average rates in comparison to the national average. This figure demonstrates that even those utilities having the highest residential rates in Washington still compare favorably with the national average.

The average rate paid by residential customers does not reveal very much about the average customer's actual electricity bill. Table 1.6 examines average annual electricity usage for Washington residential customers in 1996, as well as the average annual bill. Both of these figures are compared with national averages. This comparison points out that the average annual electricity bills of Washington residential customers are also below the national average, but not by as much as our rates. This is because customers in Washington use about 33 percent more electricity per year than the national average, probably as a consequence of our low rates.

Table 1.6. Average Annual Residential Electricity Use and Bill.

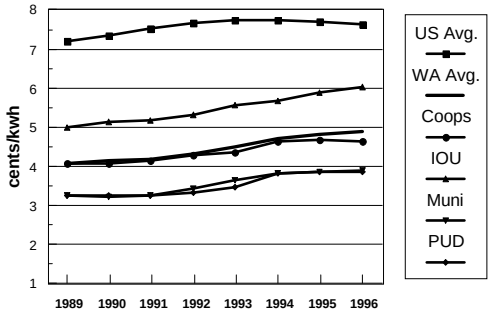
	Annual Use (kWh)	Annual Bill ($)
Washington Average	14,000	710
National Average	10,300	859
WA Investor-owned	12,900	750
WA PUD	17,000	756
WA Municipal	12,200	521
WA Cooperatives	16,900	900

Source: Energy Information Administration

Commercial Rates

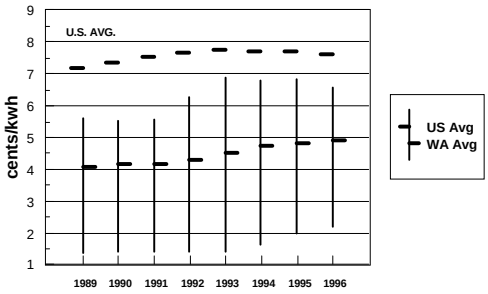
Commercial rates serve a very diverse customer sector. Customers in this sector vary from small offices, restaurants, gas stations and grocery stores to high-rise office buildings of millions of square feet. The sector also includes schools, hospitals and government buildings, as well. Most Washington utilities offer a range of rates that include at least a small and large commercial tariff. Some others offer a greater range of services. Eligibility for commercial service tariffs is typically deter-

Figure 1.13
Commercial Rates



Source: Energy Information Administration and 6560 Utility Survey.

Figure 1.14
Range in Washington Commercial Rates
Compared to U.S. Average



Source: Energy Information Administration and 6560 Utililty Data Survey.

mined by load level, either connected kW load or minimum energy use, or both. Commercial rates typically include both an energy charge and a kW demand charge. Figure 1.12 tracks the total number of commercial tariffs offered by the 18 utilities reporting data to the 6560 study. The number and variety of service tariffs offered in the commercial sector remained relatively constant over the period 1993 to 1997.

Figure 1.13 compares statewide commercial average rates with the national average for 1989 through 1996. During this period, the national average rate increased by 0.45 cents/kWh or about 6.2 percent. The Washington commercial average rate increased over this period by 0.82 cents/kWh, or 20.0 percent. About half of the difference in percentage increase is again explained by rates starting at a lower level.

Figure 1.13 also plots the statewide average rates for each major category of utility. Again, the differences in these rates reflect not only the differences in utility costs related to type of ownership, but also the nature of the areas being served. Typically, cooperatives and relatively small public utilities serve rural areas and the municipals serve urban areas. The investor-owned utilities serve a mix of urban and rural areas as do many of the public utility districts. While there is variation among the utility types, all show modest upward trends in average rates and all are substantially below the national average.

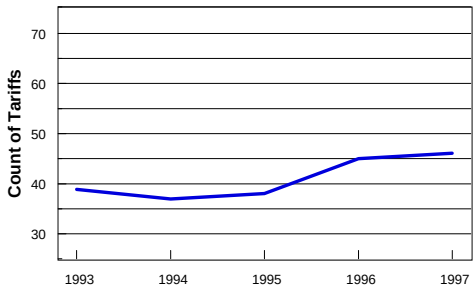
Figure 1.14 provides a more detailed look at variation among the state's 60 plus utilities by plotting the full range of average commercial rates in comparison to the national average. This figure demonstrates that even those utilities having the highest commercial rates in Washington still compare favorably with the national average.

Industrial Rates

Industrial class rates present some data interpretation and analysis problems. While utilities traditionally have provided one or more average cost-based tariffs for industrial and other large service loads, recent years have seen an increasing variety of services and pricing in the industrial sector. These include special customer-specific contracts, market-based pricing, and unbundled delivery service.

The 6560 study information provided by utilities reported all of these tariffs, contracts and other services separately. We have included all of these categories of service in the overall industrial class averages to reflect what affect they have had on overall industrial class rates. In addition, we have attempted to break these "non-traditional" services out for separate examination later in this section. In the case of unbundled services (retail wheeling) we have not included revenue and delivered kWh in the averages for industrial rates because the data do not include the energy electricity component of service. This portion of service is provided by entities other than the utility based on negotiated prices and, as such, is not reported to either the federal agencies or to the utilities. It is unavailable and therefore cannot be included. This complication was encountered only for Washington Water Power's pilot program.

Figure 1.15
Industrial Tariffs Offered
As reported for HB 6560 Study



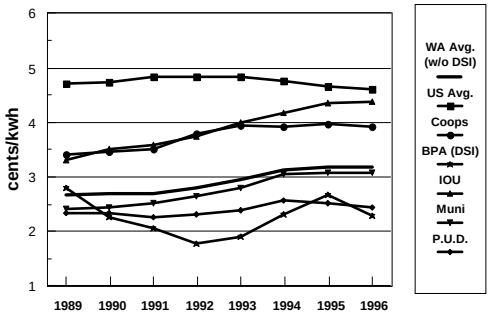
Source: 6560 Utility Data Survey

We have tracked rates charged by the BPA to the direct service industries separately. These 10 large industrial customers are the only industrial customers in Washington served directly by the federal government without a state utility intermediary that is regulated either by the WUTC, or by a local jurisdiction.

Figure 1.15 presents the total number of industrial class service tariffs reported by the 18 Washington utilities submitting information to the 6560 Study. The number of services offered has grown over the period 1993 through 1997, reflecting the efforts of utilities to tailor services more closely to the specific circumstances of industrial customers.

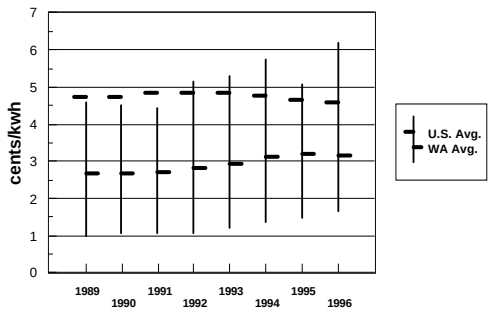
Figure 1.16 compares statewide Industrial average rates with the national average for 1989 through 1996. During this period, the national average rate *decreased* 0.12 cents/kWh or 2.6 percent. The Washington Industrial average rate, excluding BPA's direct industrial sales, increased over this period by 0.52 cents/kWh, or 19.3 percent. Figure 1.16 also plots the statewide averages of industrial customer rates for each major category of utility, including BPA. The figure demonstrates variation

Figure 1.16
Industrial Rate Comparisons



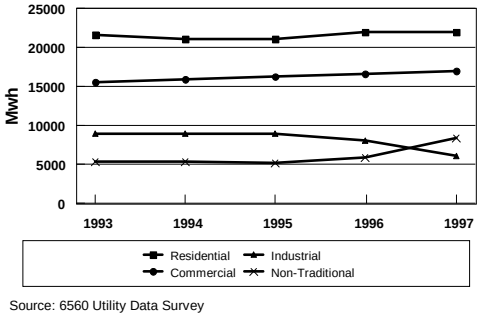
Source: Energy Information Administration and 6560 Utility Data Survey.

Figure 1.17
Range in Washington Industrial Rates



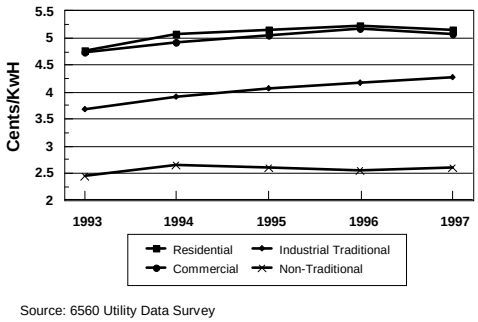
Source: Energy Information Administration and 6560 Utility Data Survey.

Figure 1.18
Annual MWH delivered By Sector
Utilities with non-traditional tariffs



Source: 6560 Utility Data Survey

Figure 1.19
Comparative Rates by Sector
Utilities with Non-traditional Rates



Source: 6560 Utility Data Survey

among the utility types due, at least in part to the factors cited above for residential and commercial rates. The average rates for all the utility categories show upward trends, but all of the averages remain below the national average.

Figure 1.17 provides a more detailed look at variation among the state's 40 plus utilities that offer industrial rates by plotting the full range of average Industrial rates in comparison to the national average. This figure demonstrates that, while the average industrial rate is lower than the comparable figure for the nation, the national figure has been declining and the state average increasing. Over the last several years some utilities in Washington are shown to have average industrial rates that exceed the national average. Closer examination of the data indicates that most of these are very small municipal utilities. But, in 1996 the group also included Puget Sound Energy.

To examine the trends in services reported by the utilities as non-traditional, Figure 1.19 plots the average rates for service under these tariffs along with average rates for industrial services not characterized by utilities as non-traditional. The term non-traditional tariff was defined in the 6560 survey instructions as "…any departures from bundled service priced at embedded cost including market-based electricity rates, unbundled services, or customer specific special contract pricing."

Several trends are apparent from these figures. First, a clear shift from traditional, embedded cost tariffs to non-traditional service began in 1995 (Figure 1.18). Second, the average rate for non-traditional service is significantly lower than for traditional industrial service. A pattern of increasing rates for the industrial loads not served under the non-traditional rates is also clear. This trend may represent a cost-shift within the industrial class, or it may reflect that the loads remaining on traditional service are fundamentally different from those taking non-traditional services. The trend towards non-traditional service represents a fundamental change in the way utilities allocate costs and risks among customers and customer classes. Figure 1.19 does not provide evidence that the trend towards non-traditional service has caused rates to *increase* for the commercial and residential classes. However, these classes have not experienced either the rate *decreases* or any changes in risk that customers taking non-traditional service may have over the last three years. This issue is further explored in Section 4.0, Electricity Rates and Equity.